

**Appl. No. 09/580,343**  
**Amdt. dated April 5, 2004**  
**Reply to Office Action of November 3, 2003**

### **REMARKS/ARGUMENTS**

Reconsideration of this application is respectfully requested.

Claims 1, 4, 6-14, 16-44, 47, 49-57, and 59 through 123 are pending in the application with claims 4, 7, 8, 10-14, 18-29, 47, 50, 51, 53-57, 61-72, 74, and 90-121 having been withdrawn from consideration, claims 2, 3, 5, 15, 45, 46, 48 and 58 having been canceled, claims 1, 6, 16, 30-34, 38-44, 49, 59, 76-80, and 84-89 having been currently amended, and new claims 122 and 123 added. Entry of these amendments is respectfully requested as it is believed they put the application in condition for allowance or in better condition for appeal.

Applicants gratefully acknowledge the Examiner's courtesy in granting a recent interview at which the issues remaining in the case were discussed. As indicated in the Examiner's Interview Summary, Dr. Benage, one of the inventors, provided the Examiner with background information regarding how the problem solved by the present invention, unwanted growth of living polymer, had arisen. In certain situations, particularly where nitroxyl compounds were used to inhibit polymerization of monomer, customers had found that living polymer had formed and had continued to grow, sometimes growing to masses of significant size. Applicants set out to find a means whereby such growth could be inhibited. They found that the addition of an inhibitor that is a hydrogen donor or electron acceptor would alleviate the problem. It was pointed out the 2,4-dinitro-6-sec-butylphenol had been found to be particularly useful, but that other inhibitors were also operable.

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Applicants pointed out that the problem solved by their invention was not considered, and probably not faced, by the patentees of the art cited by the Examiner.

Applicants presented proposed amendments to claims 1 and 44 for using terminology other than "living polymer" that they felt might clarify the claims. The Examiner was of the opinion that such clarification was unnecessary.

The Examiner suggested that the claims be drawn to be commensurate in scope with the showing in the specification.

All the claims pending in the application were discussed. With regard to prior art, discussion centered around the teaching of Winter et al.

Claims 1-3, 5, 6, 9, 15, 30-46, 48, 49, 52, 58, 73, and 75-89 have been rejected under 35 U.S.C. 103(a) as obvious over Winter et al. (U.S. Patent No. 5,254,760)

Claims 16, 17, 59, and 60 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Winter et al., *supra*, in view of Odian and Quintens et al. (U.S. Patent No. 5,372,924) and Rosenkranz et al. (U.S. Patent No. 4,053,504).

The amended claims of the application are directed to the use of a particularly defined class of hydrogen donor for inhibiting the polymer growth of living vinyl aromatic polymer that had previously been formed in the presence of a nitroxyl inhibitor in admixture with vinyl aromatic monomer(s). The claimed method requires having a phenyl group substituted with at least one OH or NHR<sub>110</sub> group and at least one NO<sub>2</sub> group.

Winter et al. discloses that the polymerization of a vinyl aromatic compound, such as styrene, during distillation or purification is inhibited by the presence of at least one stable nitroxyl compound together with at least one aromatic nitro compound.

Quintens et al. disclose antistatically treated plastic moldings which contain two layers on the surface to be antistatically treated, the layer situated nearer the plastic surface being an antistatic layer and the more remote layer being a protective layer of a radiation-curing coating composition which is cured by exposure to ionizing radiation, are distinguished by antistatic properties and surface properties.

Rosenkranz et al. disclose that stabilized acrylic acid esters of polyhydric alcohols which contain as stabilizers polymerisation inhibitors including small amounts of compounds of the styrene type show a non-reduced polymerisation reactivity.

Odian appears to be a review article relating to the suppression of the polymerization of monomers.

Both the inhibitors of Winter et al. and the hydrogen donors of the present invention can be used to inhibit the polymerization of ethylenically unsaturated monomers. However, a key difference between the disclosure of Winter et al. and the basis of the currently claimed invention lies in the *new use* of the claimed hydrogen donors as *anti-growth agents*, i.e., agents that prevent the growth of living polymer that is sometimes, but certainly not always, present in monomer preparation systems. Such growth can occur under the same conditions as the polymerization conditions in the Winter et al. patent, but there must also be present a *seed capable of growing*, i.e., the living polymer, in order to have growth possible. The method of

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inhibiting growth is clearly not the same as the method of inhibiting premature polymerization, as described by Winter et al., as shown by the performance of nitroxyls alone. Nitroxyls alone are highly effective in preventing premature polymerization, as is seen in various literature and patent references; however, nitroxyls alone do not prevent living polymer growth, as illustrated in our testing. (See the Examples of the present application, in particular, the data of Tables 1 through 4.) Thus, use as a polymerization inhibitor does not establish use as a living polymer anti-growth agent. These are two different uses for known compounds that can occur under similar conditions; however, the growth condition requires the presence of a seed capable of growth, the inhibitor-terminated polymer chain capable of participating in a dynamic equilibrium between a dormant species and an active polymer chain (living polymer) of the present claims.

It is submitted that none of the cited references, alone or in combination, disclose the problem solved by the present invention or its solution, which lies in the use for the claimed hydrogen donors.

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In view of the foregoing, it is submitted that this application is now in condition for allowance and an early Office Action to that end is earnestly solicited.

Respectfully submitted,

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